



IDEAS

7FRDP Specific Programme

ECTRI INPUT



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This paper is complementary to ECTRI's previous « ECTRI 7FRDP input » paper (dated 12 November 2004) and its statement of 29 June 2004 regarding EC COM (2004) 353 final.

It is aimed at providing additional inputs to the preparation of the following specific programmes a planned in the EC 7FRDP proposal COM (2005) 119 final (6 April 2005).

- IDEAS

The structure of the paper follows that of the final bullets of COM (2005) 119 final bullets; it addresses some issues raised from the point of view of surface transport research.

It is one of a series of inputs for the 4 following 7FRDP specific programmes

- COOPERATION – ECTRI report 2005-02
- PEOPLE – ECTRI report 2005-03
- CAPACITIES – ECTRI report 2005-04
- IDEAS – ECTRI report 2005-05

REMINDER

Objective:

This programme will enhance the dynamism, creativity and excellence of European research at the frontier of knowledge. This will be done by supporting “investigator-driven” research projects carried out across all fields by individual teams in competition at the European level. Projects will be funded on the basis of proposals presented by researchers on subjects of their choice and evaluated on the sole criterion of excellence as judged by peer review.

Rationale:

Investigator-driven “frontier” research is a key driver of wealth and social progress, as it opens new opportunities for scientific and technological advance, and is instrumental in producing new knowledge leading to future applications and markets.

Despite many achievements and a high level of performance in a large number of fields, Europe is not making the most of its research potential resources, and urgently needs a greater capacity to generate knowledge.

A Europe-wide competitive funding mechanism for frontier research executed by individual teams is a key component of the European Research Area, complementing other EU and national activities. It will help reinforce the dynamism and attractiveness of Europe for the best researchers from both Europe and third countries, and for industrial investment.

Source EC document COM (2005) 119 final

I – Individual teams including new groups, new researchers

ECTRI believes that there is need for frontier transport research, for three reasons:

- to capture new ideas, new scientific developments and new technological developments that could be of interest for transport
- to capture new talents for the creation of the next generation of scientists
- to create a new European reservoir of knowledge within the worldwide competition between knowledge societies.

Due to the complexity of transport systems and their dynamics, ECTRI considers that there is a need to have to international excellence not only through disciplinary research but also through research at the convergence of various disciplines, research joining various disciplines, including life-sciences engineering, social sciences and the humanities, and through systemic frontier research.

II – Excellence / peer review

ECTRI supports that the excellence should be assessed through a peer review process in a similar way to that of the US National Science Foundation, capable of dealing with non-pure disciplinary research.

III – Needs for frontier disciplinary research

ECTRI believes there are three disciplinary areas that are in particular need of frontier research because a lack of basic knowledge or approaches are still barriers for transport focused research.

Scientific knowledge for traffic and transport behavioural and societal aspects

This is an increasingly interesting area for research that follows the almost exclusive emphasis on technological developments and applications in the field of Transport given in the '90s. In this area one should include consideration at both the micro level, i.e. focusing on the individual user, and the macro level including planning and implementation issues, and also concern arising from large socio-technical systems interacting with societies.

It is in fact nowadays widely recognized that technological implementations are only one of the levers that will allow transport systems to evolve towards more sustainable equilibria; a second lever is the set of socioeconomic and behavioural factors that influence personal attitudes and choices. This links to the introduction of new ideas coming from various disciplines, and to have new trade-offs or balances of multidisciplinary assemblages, not only from social or human sciences but also from life sciences or integrative sciences such as cognitive sciences. ECTRI thus considers that two focal points for 7 FDRP actions concerning this priority should be: the integration of engineering and non engineering research methods in the transport sector; and the research needs relating to the introduction of large socio-technical systems in societies in different phases of economic and demographic development.

The scientific community has started revising all the behavioural and societal scientific corpus known today, but not yet in a systematic way. The first step should then be to deepen the scientific knowledge through various instruments such as excellence teams, NoEs, societal IPs and eventually CAs.

The best manner to do it is to focus this scientific shift around transport focused questions. It is important to structure the supply side of research such that it addresses research need while respecting scientific internal processes. Regarding potential research topics, both industry and policy makers show a crucial interest to find answers to questions related to advanced marketing research for products, systems or services, research for acceptability or acceptance of products, systems or services, and potential policy constraints such as sustainability issues.

Transport economics research

This, like safety and security, also seems to be a core area of interest. It includes topics such as pricing for the use of infrastructure, proper pricing of transport services, (econometric) modelling, methods for evaluating economic policies in the field of transport (where the money goes and what are the real choices), pricing policies, etc. As mentioned previously, a most important topic is also the “economics” of productivity and employment of the transport system (and the relationship between transport and land use), as well as the “economics of multi-modality”, i.e. the investigation of the costs and prices for making multi-modal transport more competitive.

ECTRI believes that transport economics in itself has to be revisited in line with the evolution of approaches to transport planning, charging, tolling, and operating but also in line with other transport related issues such as environment, energy or land use because that is the locus of convergence of various sub disciplines of economics sciences such as service economics, industry and manufacturing economics, financial service economics in addition to the economics of infrastructure or network.

This is true of deregulation or new statutory organisations, that need to revisit concepts of natural monopoly in industry, essential concepts of infrastructure and social marginal cost charging, to introduce transactional costs linked to the new organisational arrangements, and also to address economic barriers to entering the market, and to a fair system of access to the infrastructure network.

This is true because of competition between supply of services, and also through private-public or public-public partnerships providing or funding universal or added services. It is also true because transport economics have to address not only efficiency, but also accessibility to transport services, charging with a financial system that distributes costs and benefits equitably. It is true because of the status and role of the various stakeholders in the transport system and markets: regulatory authority, societal demand, service providers, and infrastructure service operators.

This brings ECTRI to propose the following set of issues as a package, to re-establish and enhance European excellence in transport economics.

Firstly, there are requirements for European wide “soft transport research infrastructures”; even if requirements are concerned with issues covered by subsidiarity, European transport research

has to address the needs of all European governments (EU, State members, Acceding Countries, regional and local governments). First of all, a large data base on transport economics projects and results is of relevance. A second regularly updated database, freely accessible, regarding the flow of goods within the European internal market, including international flows, should be created for data mining, econometrics,.... This should address all shipping allotments (from parcels to containers, full load and part load) to rail or vessel bulk load. the aim of this database should be, through a harmonized approach, to cover all logistic and transport related issues to be data mined through surveys or researchers. In the domain of person mobility, there are requirements for of such a database for intercity passengers, rural and urban mobility and intermodality. Third, a European-level virtual library on transport economics, with physical access and an electronic interactive environment dedicated to database access, is; Europe has to catch up with fill the American concept of a network of transport libraries.

Secondly, on the thematic side and because of the increasing importance of transport economics sciences and scientists, it would be efficient for STERA to create networks of excellence dealing with new transport economics based on state-of-the-art reports (ECMT, ECTRI). These could be:

- focused on a group of disciplines;
- focused on urban mobility economics, intercity mobility economics, goods transport and logistics economics;
- focussed on charging, tolling and financing transport services or transport infrastructure services.

Transport network reliability research

The issue of infrastructure reliability is of paramount importance for economic growth, European integration and more specifically the development of Trans European Networks. In the case of transport, worsening travel time reliability is a major problem of national and trans-European transport networks. It affects commute trips and most other trips during the peak travel periods. Furthermore, it is a significant concern of large and small businesses in all parts of the economy. Worsening transport reliability generates costs due to: prolonged waiting times; connections missed; appointments missed; missed opportunities for applying Just-in-Time to physical distribution, production and the management of stocks; other negative effects on business efficiency. The future holds more of the same. Population and employment growth in Europe's large cities are expected to continue rising, resulting in increasing transportation activity and increasing pressure on the transportation system.

Research efforts should be focused on developing a generic framework for improving, measuring and valuation of reliability in transport networks. To develop insights that can constitute the rational foundation of future European policy programs on transport reliability, the research program should rely on a multidisciplinary approach, including: network design; value of time; value of reliability; road pricing; management of traffic information; travel behavior; incident management; new institutional arrangements.

Reliability is not only a major issue in transport networks but also in other infrastructure sectors such as: energy, telecom or water supply. Here, the challenge is to translate fundamental insights on transport into lessons for other infrastructures.

IV – Needs for frontier research at the convergence of various disciplines

ECTRI believes that there is a particular need for frontier research at the convergence of various disciplines because the lack of basic knowledge or methodologies is still a barrier for transport focused research.

For example, convergence of medical sciences, life sciences and social and human sciences is crucial for the treatment of transport issues in relation to health, and especially with regard to transport safety and security (epidemiology...). In this subject area there are very few excellent European teams competing with the best teams in North America.

A second example of this convergence between medical sciences, life sciences and engineering sciences is with regard to vehicle safety and transport security where the competition is through the emergence of India and China. One good example in this area is the issue of driver assessment of elderly, disabled and other specific drivers' cohorts.

A third example is the convergence between nanotechnologies, engineering sciences and human sciences for the future safety devices of vehicles and the transport system.

A good example in this area is the ability to capture unobtrusively and utilise physiological signals of the driver (i.e. EEG, EOG, ECG, EMG) merged with behavioural vehicle and traffic parameters, to define driver status and thus the optimal level of driver support at each instance.

A fourth example is the convergence between life sciences, medical sciences, ICTs, human sciences and cognitive sciences in relation to around human-machine interaction and simulation.

V – Needs for systemic and complex system frontier research

Many issues concerning transport, including the interaction between environment and safety, require a systemic approach creating sufficient relevant scientific knowledge through the assemblage of scientific knowledge from other disciplines. As transport systems are by their very nature dynamic, the associated required research will tend also to be complex.